Space Weather Forecast

Issued on Monday, 02 September 2024 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class flares expected, slight chance of Strong flares. Chance of G1-G2/Minor-Moderate Geomagnetic storms days 2 and 3 (03 and 04 Sep). Chance of reaching S1/Solar radiation Storm levels on days 1 and 2 (02 and 03 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate with up to five Moderate-class flares in the past 24hrs, peaking with a long period flare at 01/1322UTC from the southeastern limb. There are ten sunspot regions on the visible disc, three of which are of note. One in the southwest is the largest region, showing continued growth, with an increasingly complex intermediate section which has now formed a delta region. One in the southeast close to centre disk is showing minor proliferation of intermediate spots, and also retains it's small weak delta spot in the southern portion. Finally, a region in the far southeast appears to be a large and complex region with mature penumbra around leading, trailing and compact central regions. This spot may show some further complexity yet, though due to foreshortening it is hard to distinguish the magnetic configuration at present. All other regions are relatively simple and stable.

No Earth directed coronal mass ejections have been observed, though a large eruption off the southeastern limb during the UTC afternoon of 01 Sep may give slight peripheral impacts.

Solar Wind / Geomagnetic Activity: Solar wind parameters, as measured by ACE at L1, have generally been at background conditions. Wind speeds have ranged from slow-ambient to slightly elevated. The Interplanetary Magnetic Field, Bt, was weak throughout. The important north-south component, Bz, was similarly weak, fluctuating erratically between positive ad negative. Geomagnetic activity was Quiet to Active (Kp 2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has risen in response to a large flare but has remained below the S1/Proton Storm level, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected with a slight chance of isolated Strong flares. The main flare risk is currently from any of the three larger sunspot regions in the southern hemisphere.

Solar Wind /Geomagnetic Activity: There are no Earth-directed coronal mass ejections currently expected, though peripheral impacts from the subsequent coronal mass ejection from the M5.5 flare on 01 Sep may occur at Earth on days 2 or 3 (03/04 Sep). A possible enhancement may occur day 1 (02 Sep), from a narrow negative polarity equatorial coronal hole. Any significant enhancement is unlikely however, with solar winds remaining slow-ambient to slightly elevated.

On the whole, mainly Quiet to Unsettled (Kp 2-3) activity is expected. On days 2 and 3 (03/04 Sep) there is a chance of G1-G2/Minor-Moderate Storm intervals (Kp 5-6) should there be any peripheral impacts from the M5.5 Flare from 01 Sep.

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Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to remain mostly at background levels, with a chance of exceeding the S1/Minor Radiation Storm threshold.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	30	30	1
Strong	G3	No	1	5	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	30	30	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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